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ABSTRACT

By far the greatest impact from technology on higher education has been made by the World Wide Web. The Web has become ubiquitous and skill in using it is now assumed in higher education. This document offers examples of the impact of the Web at the University of Central Florida, Orlando, a campus that is considered to be a leader in using the Web. Examples are given of Web impact with reference to: (1) communication; (2) access by new audiences; (3) institutional infrastructure; (4) faculty training and development; (5) curriculum revision and development; (6) student support; (7) learner centered teaching; (8) changes in teaching style; (9) administrative support; and (10) research opportunities. Several references and an example from the University of Central Florida are given for each of the areas. (SLD)

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Impact of the Web on higher education: a case approach offered for discussion

Oxford Round Table
June 30-July 5, 2002

Oxford, England

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Overview

Technological inventions have impacted higher education, but typically have taken a much longer period to develop. The telephone, invented in America in1875, has been used for teaching for a short 60 years, and only recently for students to registrations for courses. The fax machine, invented in France over 40 years ago, is now a staple technology, yet in many situations, outdated already—by email attachments.

Of course the big technological invention is the computer, when it became a personal use device. It has been only 56 years since the Electronic Numerical Integrator and Computer (ENIAC), "the first large-scale general-purpose electronic computer," (Goldschmidt, A.& Akera, A., 1996) was developed.

The World Wide Web, as we know it is new, however pieces of the Web have been developed over nearly 60 years. In 1945, Vannevar Bush wrote "about a photo-electrical-mechanical device called a Memex, for memory extension, which could make and follow links between documents on microfiche" This was followed in 1965 by Ted Nelson who coined the word "Hypertext" (W3C). A mere decade ago in, December 1991, Tim Berners Lee developed what we now know as the World Wide Web, there were no predictions then about the impact on Higher Education.

By far the greatest impact from technology on higher education has been made the World Wide Web. Time after time, instance after instance, colleges and universities are using the Web as a mainstream tool. The Web is ubiquitous and skill in using it is assumed. As Berners-Lee describes the Web, "the web is already so much a part of our lives that familiarity has clouded our perception of the Web itself." (Berners-Lee, 1999, p.2).

Case examples offered throughout are based upon one higher education institution, the University of Central Florida, Orlando, Florida, USA, (http://www.ucf.edu) which has not only been impacted by the Web, and is considered to be a leader in using the Web. It seemed appropriate to offer examples from a sole higher education institution to see the impacts across one institution. The Web has truly impacted us all in higher education and I am most fortunate to be at a university, which embraces uses of the Web—internally and externally, locally and globally.

References

Berners-Lee, T. & , Fischetti, M. (1999). Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web by its Inventor. Harper San Francisco

Goldschmidt, A.& Akera, A., (1996). John W. Mauchly and the Development of the ENIAC Computer. Retrieved June 1, 2002 from http://www.library.upenn.edu/special/gallery/mauchly/jwmintro.html.

W3C, "A Little History of the World Wide Web from 1945 to 1995. http://www.w3.org/History.html, Retrieved June 25, 2002

Communication

Importance:

The educational community - within a campus as well as among campuses - is extended and expanded by use of the Web. Transcripts and other official records can be transferred in seconds instead of days. Accessing course numbering systems, providing students with syllabi, and posting of course schedules are all possible through the Web.

"The Internet's ability to disseminate information quickly on a global scale provides an invaluable communication tool for empowerment evaluation." (Fetterman, D., 1998). Whether global or local the (World Wide) Web can be used effectively to disseminate, access, and share information; information of timely nature critical to the institution, to provide better decision making.

References:

Fetterman, D. (Volume I, November 18, 1998). *Empowerment Evaluation and the Internet: A Synergistic Relationship*. Retrieved June 19, 2002 from the Current Issues in Education Web site: http://cie.ed.asu.edu/fall98/fetterman/fetterman.html

Institution examples:

From the initial Web page (http://www.ucf.edu) students, faculty, staff, and interested persons can navigate, search, review the daily news, access department information, complete evaluations, and a myriad of other tasks, which before the web took contacting by telephone, sending by inter-campus mail or fax, and replying—a process which took days or weeks. We are now in the era of instant replies, better informed to make decisions, and have access to information never possible before the Web.

The Physical Plant maintains buildings, therefore it is critical the current information is accessible and that work orders are processed expeditiously. Using the Web this is all possible--http://www.pp.ucf.edu.

At a university thousands of purchases are made daily and most is funneled through Purchasing, http://pegasus.cc.ucf.edu/~purchase/. Strict guidelines must be followed; how better to view these than on the Web?

For students, being able to access their records anytime and in real time is important. They desire and have a right to see their records, register for courses, and view changes easily. The Personal On-Line Access to Restricted Information Systems (POLARIS) system permits this type of access (https://polaris.ucf.edu/).

Access by new audiences

Importance:

The impact of the Web in the area of access by different audiences is tremendous, reaching potential learners where higher education, especially in subject areas of their choice, is not offered through local institutions, or in some cases, is not accessible at all. The Internet offers higher education to people all over the World, in all languages, on all subjects, without time or location constraints

Loss of personal interaction is one concern about using the Web for instruction according to O'Banion, (1997) but others point to the ability of technology to increase productivity by allowing existing faculty to reach more students, fewer faculty to teach the same number of students, and students around the world access to courses no matter their transportation, work shift or time zone; anyway, anywhere, and anytime.

Brown, B. (2000), explains that Education and training via the World Wide Web are growing rapidly. Reduced training costs, world-wide accessibility, and improved technological capabilities make electronic instructional delivery to adult learners a viable alternative to classroom instruction. This examines the efficacy of Web-based (WBT) training, including market demand, learner participation, training options, and program design issues. Also: learning outcomes and suggestions for improving outcomes through implementing appropriate instructional design principles.

References:

Brown, B. (2000). *Web-Based Training*. ERIC Digest No. 218. Retrieved June 19, 2002 from the ERIC database: http://www.ericacve.org/docgen.asp?tbl=digests&ID=103

O'Banion, T. (1997). A Learning College for the 21st Century. American Association of Community Colleges. Phoenix, AZ. (p. 66).

Institution examples:

A US movie made in the 1960's titled "Guess who's coming to dinner" best describes this impact. The Web produces similar surprises in higher education—guess who's coming to college?

Results of in-house research the following has been determined:

1) the majority of students (75-80%) who enroll in fully online courses on our campus are also enrolled in face-to-face courses, 2) the distribution of students by ethnicity is the same for fully online, web-enhanced, mixed-mode, and comparable face-to-face courses, 3) fully online courses consistently have more females, 4) on the average, students who enroll in fully online courses are older than those who enroll in web-enhanced or comparable face-to-face courses, 5) roughly half of students who take fully online courses are working full-time, and 6) eighty to ninety percent of students who enroll in web or web-enhanced courses have computers at home. (http://pegasus.cc.ucf.edu/~rite/)

Institutional Infrastructure

Importance:

With the increased use of technology and the Internet in higher education, changes to the institutional infrastructure vary from increased yet streamlined workloads for faculty and staff to the addition of truly Web-devoted support staff.

Not only do Internet applications require increased training for existing staff members; new positions must be created to support Web-based learning activities, to support online registration, to produce online course catalogs, and other instructional and support materials.

The need to restructure the institutional infrastructure to incorporate the power of the Internet is a daunting task, but one that must be accomplished in order to remain competitive and efficient in the educational marketplace.

As organizations restructure and reengineer themselves into new shapes, the role of support staff is being transformed. Technology is the driving force behind much of the change. (Kerka, S., 1995). Information technology unsettles universities as institutions, but institutions are shaped by information, and exist largely to alleviate information problems. So now they are confronted with drastically improved technologies of information, and so, universities as institutions may evolve into places to pool knowledge (Agre, P., 2000).

References:

Agre, P. (2000). Commodity and Community: Institutional Design for the Networked University. *Planning for Higher Education.* 29(2), 2000, pages 5-14. The Society for College and University Planning. Retrieved June 19, 2002 from: http://dlis.gseis.ucla.edu/people/pagre/commodity.html

Kerka, S. (1995). *The Changing Role of Support Staff. Trends and Issues Alert*. ERIC Digests. Retrieved June 19, 2002 from the ERIC database: http://www.ericacve.org/docgen.asp?tbl=archive&ID=A019

O'Banion, T. (1997). A Learning College for the 21st Century. American Association of Community Colleges. Phoenix, AZ. (p. 66).

Institution examples:

At UCF there are departments and jobs which only exist because of the Web. Since the summer of 1996 when the first course went on-line, there is now an office of Distributed Learning, http://distrib.ucf.edu/ responsible for approving courses to be put on-line, http://distrib.ucf.edu/studentinfo/home.html, and Course Development and Web Services, http://cdws.ucf.edu/, responsible for faculty training in using the Web for courses. Within the latter there are staff known as "Techrangers," HTML coding and Web support.

Faculty Training and Development

Importance:

With the Web, the role of instructors changed to one of a facilitator who can assist students in gathering, reviewing, and applying knowledge gained from a vast array of sources, which allows instructors to further train for their developing role as learning facilitators who assist students in analyzing and using that information available on the Internet for their personal learning needs. The instructor no longer has to be the sole knowledge expert trying to keep up to date with an exploding field of information. Information is simply there. It is readily available to everyone, immediately accessible, easily complied and creatively presented," says O'Banion. (1997).

More faculty centers for teaching and leaning have developed recently. And many of these centers support faculty teaching via the Web. Faculty members have access to training, developmental activities, lesson plans, up-to-date instructional materials, grading rubrics, electronic portfolios capabilities, learning exercises and more training and developmental resources through the Internet.

References:

O'Banion, T. (1997). A Learning College for the 21st Century. American Association of Community Colleges. Phoenix, AZ. (p. 75, 77).

Institution examples:

Multiple avenues have developed to provide training for faculty on teaching using the Web. It is university policy that ALL faculty and teaching assistants must complete formal training "IDL 6543" (http://cdws.ucf.edu/) before being allowed to teach a modified or fully web-based course. A second avenue is the ongoing training offered through Course Development &Web Services (CDWS). Thirdly, the Karen L. Smith Faculty Center for Teaching and Learning (http://fctl.ucf.edu/) offers regular workshops and institutes for faculty (http://fctl.ucf.edu/wksps_insts/wksps_insts.html), which address the teaching in general and in conjunction with CDWS address the needs of faculty teaching using the Web.

Curriculum Revision and Development

Importance:

Curriculum development and revision activities available online for instructors of higher education offer many supportive features such as databases of employer job skills, software for curriculum development and revision, and workforce development employee proficiency training, and will "change the structure of the fundamental 'business' of education" according to Green & Gilbert. (1995)

"Regardless of the findings of future researchers on the quality of interaction through technology, humane and fulfilling interactions through technology are already firmly established in the culture, first by the U.S. mail, then by the telephone, and now by the Internet. It only remains to be seen how educators will creatively apply the technology to extend and expand opportunities for connectedness, community, and collaboration." (O'Banion 1997)

References:

Green, K. & Gilbert, S. (March/April 1995). Great Expectations: Content, Communications, Productivity, and the Role of Information Technology in Higher Education. Change.

O'Banion, T. (1997). A Learning College for the 21st Century. American Association of Community Colleges. Phoenix, AZ. (p. 77-78).

Institution examples:

This item is specifically addressed through the required training for faculty and graduate teaching assistants teaching on the Web through a CDWS "course" IDL 6543 with the express goal of "how to teach online using a combination of class meetings, labs and web-based instruction. The purpose of this 'course' is to help you succeed as you plan, design and develop your online or media-enhanced courses" (http://reach.ucf.edu/~idl6543/). Through a proposal review process, faculty submit a plan for revising or developing a course for on-line use, get approval from their Chair and Dean, and receive "release time" or a laptop computer to accomplish the goal. Both in-person and Web activities are used over a semester, then a course is readied for implementation.

Student Support

Importance:

Nearly every aspect of students' educational experience can be conducted over the Internet. Students may "shop" on the Internet for courses, degree programs, and schools all over the World. Then, they can apply online. The entire admissions process, from submitting applications, to presenting portfolios and even including applying for financial aid, can be conducted on the Internet.

Next, students can peruse course schedules, register for courses, and pay for courses online. When it is time for class, they can conduct research, complete class work, even participate in testing on the Internet. Once courses are completed, online feedback surveys can be submitted, grades reviewed, graduation plans made, and even transcripts requested. It is now possible to complete entire degrees over the Internet, from start to finish. These service features allow students who have unusual work schedules, family obligations, or remote residences to conduct all aspects of their education online.

Education when you want it, where you want it, and how you want it is possible with Internet capabilities fully supporting every aspect of education by offering access to museums, library collections, journal articles, research, legal documents, graphics; anything a student could require at any time, day or night. Skeptics of technology's potential to reinvent schools fear it benefit to rich schools only, widening the gap between "haves" and "have-nots." But, information technology can transform students' education, and around the U.S. schools use the Internet to access information and talk to students throughout the world (National Academy of Science, 2002).

"The Internet provides a dramatic shift in technological opportunities for learners to engage in learning experiences totally free of time and place bonds associated with traditional educational structures. Learning will become more useful and more meaningful when it can be scheduled at the learner's convenience, and when it can be individualized for the learner's time and the learner's place" (O'Banion 1997). Student support then, continues ion the homes and is not restricted to the physical campus. This is important because these new students may not even go to the campus buildings ever.

References:

Levy, S. (December 25 1995/January 1, 1996). The Year of the Internet. Newsweek.

Reinventing Schools: The Technology is Now! Ensuring Equity. (2002) Retrieved from the National Academy of Sciences Web site: http://www.nap.edu/html/techgap/equity.html

O'Banion, T. (1997). A Learning College for the 21st Century. American Association of Community Colleges. Phoenix, AZ. (p. 72).

Institution examples:

If students are not supported through Web services then what else can occur? From application through graduation, students use the Web to access information (http://www.ucf.edu/contact/), complete undergraduate (http://pegasus.cc.ucf.edu/~admissio/) or graduate (http://graduate.ucf.edu/) applications, check records, enroll in courses, and check for graduation (https://polaris.ucf.edu/).

Learner Centered Teaching

Importance:

Educators know technology produces and improves learner-centered instruction in higher education by creating opportunities for students to make choices based on and apply knowledge gleaned from the Internet says Doucette (1994). This empowerment for students to choose the means of gathering information, the content on which to focus, and the application to be performed are all part of the Internet's power to move education from teacher-centered learning to learner-centered teaching.

The process of shifting control from teacher to student while giving up control over delivery mechanisms empowers students to choose the manner they acquire information and learning activities they find effective as part of the learner-centered teaching process. Doucette (1994) says emphasizing student learning instead of teaching methodology gives students the ability to gain access to information, interpret it, give it context, use it to solve problems, and collaborate with others in problem solution.

Technology also enhances communication between students and faculty, provides access to many sources of current information, and allows instructors to "tailor educational resources to the diversity of learning styles, cultural differences, skill levels, motivations, disabilities, and educational objectives of an increasingly pluralistic student body," says O'Banion (1997), who also says this is the key to transforming processes from teaching-centered to ones that are learner-centered.

Generation X workers resent labels (slacker, arrogant, disloyal, short attention span) that less likely reflect behaviors than perceptions of managers unused to new learning. These learner characteristics reflect a need for new teaching, learning strategies cognitive scientists promote: context/cooperative learning, real-world knowledge application, Brown, B. (1997). These new students, in addition to adult learners are coming to class, and are very skilled in using the Web.

References:

Brown, B. (1997). *New Learning Strategies for Generation X.* ERIC Digest No. 184. Retrieved June 19, 2002 from the ERIC database: http://www.ericacve.org/docgen.asp?tbl=digests&ID=37.

Doucette, D. (1994) Transforming Teaching and Learning Through Technology. In Teaching and Learning in the Community College by Terry O'Banion and Associates. Washington, D.C. American Association of Community Colleges. (p. 23).

O'Banion, T. (1997). A Learning College for the 21st Century. American Association of Community Colleges. Phoenix, AZ. (p. 66).

Institution examples:

Research about being learner centered on our faculty who teach on-line reveals: 1) "The majority of faculty indicate that more interaction occurs in their web and web-enhanced courses than in their comparable face-to-face sections. They also indicate that they feel this interaction is of higher quality than what they typically see and 2) Positive aspects of web teaching cited by faculty include structure and time convenience, increased student outreach and contact (http://pegasus.cc.ucf.edu/~rite/).

Changes in Teaching Style

Importance:

The ability of the Internet to impact teaching styles is still being explored. Not only does the Internet allow teachers to connect with students more often, and on a more personal level, but it also allows instructors to tailor educational activities of each student to their particular needs. Education on the World Wide Web is growing fast. Reduced training costs, world-wide accessibility, improved technological capabilities make electronic instructional delivery to adults an alternative to classroom instruction, Brown, B. (2002).

"Educators place great value on "individualizing instruction" as the hallmark of their best efforts. Technology can greatly assist in achieving the goal of assessing differences and providing "individualized instruction" for those differences in a variety of learning options." (O'Banion, 1977)

Other changes in teaching styles made possible by the Internet include incorporating a wider variety of and more current information about subjects, changing teaching styles to include more performance-based learning, changing from face-to-face to online delivery, changing from meeting with students two or three times a week to connecting with them on a daily basis, and even changing their working hours to include evenings, weekends, and holidays and their working location to wherever they are in the World.

References:

Brown, B. (2000). *Web-Based Training*. ERIC Digest No. 218. Retrieved June 19, 2002 from the ERIC database: http://www.ericacve.org/docgen.asp?tbl=digests&ID=103

O'Banion, T. (1997). A Learning College for the 21st Century. American Association of Community Colleges. Phoenix, AZ. (p. 72-73)

Institution examples:

Further research about the UCF on-line faculty address this impact: "Eighty-seven percent of UCF faculty surveyed indicated they have changed their approach to teaching as a result of their online teaching experience. …responding more to student needs" (http://pegasus.cc.ucf.edu/~rite/).

Administrative Support

Importance:

Administrative support made possible by the use of the Internet in higher education has streamlined many tasks. Productivity has been increased through transaction processing activities such as online course payment and online registration, as well as data management of everything from grades to budgets.

"Information technology has been widely adopted in colleges and universities for administrative functions" (O'Banion, 1977). Incorporation of the web permits much information to be placed for greater access and printed at the desktop level, if printed at all. Items such as: Adverse weather policy, policy on illegal drugs, unauthorized copying or use of computer software, research policies manual, sexual harassment policy, and patent and copyright procedures (NC State University, unknown date).

References:

NC State University Computing services. "Administrative uses of the Web at NC State University" http://www.ncsu.edu/it/edu/talks/admin_uses.html, Retrieved June 25, 2002.

O'Banion, T. (1997). A Learning College for the 21st Century. American Association of Community Colleges. Phoenix, AZ. (p. 75).

Institution examples:

If there was not administrative support across the institution and from the President (http://www.ucf.edu/president/ and Provost (http://pegasus.cc.ucf.edu/~provost/) we would not have received awards in distance learning (http://distrib.ucf.edu/dlucf/awards.htm) and Web offerings. The Web is indeed omnipresent in what we do and how we do it. Use of the web is immersed in the university. For example through Administration and Finance (http://pegasus.cc.ucf.edu/~admfin/) connections to various departments can be accessed; and at UCF Top Links (http://www.ucf.edu/topucflinks.html), general information, athletics, bookstore, admissions, and several other services can be accessed. The Web provided information for both internal and external constituents.

Research Opportunities

Importance:

Ironically enough, and a criticism of nearly every technological invention, the Web has actually brought faculty together for common research. With the telephone, radio, and television concerns were expressed that society would forget how to communicate and socialize. With the Web as a "common denominator" across disciplines, faculty discuss teaching and learning situations, without the content barriers or turf issues.

Actually completing research via the Web has become more common. "As the World Wide Web (WWW) has grown in popularity, the use of Hypertext Markup Language (HTML) forms or Web-based surveys are becoming the dominant method of gathering survey data. These forms streamline the data collection process formatting and entering responses directly into a database for analysis" (Solomon, D., 2001).

More journals, new and existing, are transferring to the Web format, decreasing printing and postage costs, increasing circulation and access, and making them truly international. "Since the World Wide Web's inception in 1989, more information is available to more people today than at any other time in our history. Such an information-rich environment provides a wealth of opportunities for scholars and practitioners of education to access a variety of electronic resources. Web resources include reports, papers, policy positions, etc., many of which are available full-text." (Slowinski, J., 1999).

References:

Slowinski, J., (1999). "Using the Web To Access Online Education Periodicals. ERIC Digest". ED430584, Retrieved June 25, 2002 at http://www.ed.gov/databases/ERIC_Digests/ed430584.html.

Solomon, D, (2001). "Conducting Web-Based Surveys". ED458291, Retrieved June 25, at http://www.ed.gov/databases/ERIC_Digests/ed458291.html.

Institution examples:

It is because of the Web that we now have the Research Initiative for Teaching Effectiveness(http://pegasus.cc.ucf.edu/~rite/). This office, organized directly under a Vice Presidential level, coordinates institutional research on using the Web for teaching and "supports UCF faculty in formulating and implementing research on effective teaching practices in higher education" (http://pegasus.cc.ucf.edu/~rite/). The Institute collects data and completes research, and promotes faculty collaboration for Web research. The Institute is institutional in nature and not affiliated with any one college, thus providing a much broader base of support and acceptance.

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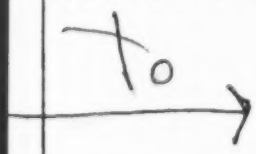

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